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A CONFIGURABLE COURSE FEEDBACK SYSTEM WITH SENTIMENT POLARITY DETECTOR

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ABSTRACT

This paper presents experimental design for opinion extractor from free-form texts and its deployment in configurable course feedback system. A configurable system is implemented through which interactive course feedback forms can be generated. The feedback-form contains close-ended questions and also text boxes to enter free-form responses. The algorithmic formulation has been designed to compute opinion polarities from the free-form text responses entered by the users. The system produces a comprehensive output for the use of teachers and/or academic administrators. The deployed system is not only easy to use and configurable but also allows users to choose the way they wish to respond (either only as free-form text responses or free-form text responses with answers to some close ended questions). The system has been evaluated on reviews collected from ratemyprofessor website.

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INTRODUCTION

The overwhelming inclination towards eLearning concept and Massive Online Courses (MOOCs) is an alluring phenomenon to analyze. These courses usually have a forum where students can express their views about that particular course. Student course feedbacks are now coming in focus in traditional classroom teaching also, institutions are now much curious to know about what opinion and feedback their students hold about a particular course and instructor. In either of the situations, huge number of feedbacks may be received for one or more courses by large number of students. It is in this context that this work has been placed on opinion mining from course feedbacks. In course feedback system, there can be two types of questions: one are closed ended questions with fixed responses, and second are open ended free-form text boxes. Open ended questions give freedom to student to share their experience about the course freely. Though, the reports generated on feedback only use numeric value fields and not the free-form text. It is very complicated to read manually all the free-form texts. Therefore, the system has been

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designed which automatically computes polarity of opinions expressed in course feedback responses by the students.

The rest of the paper is organized as follows: the section 2 briefly describes about the dataset. The section 3 explains about the designing and working of configurable feedback system. The paper concludes in section 5, with a discussion of results and the usefulness of this work.

DATASET

The system is evaluated by inputting data collected from ratemyprofessor website. A total of 1294 student feedback reviews for 2 Professors, namely Andrew and Joseph Morrissey are collected. The dataset is labeled on sentiment based on the rating information. The system is run on this dataset to test the functionalities.

RESULTS

A web-based Configurable Feedback System is developed to provide feedback in an easy and quick manner to the administration. By using this technology, student feedback about the instructor can be collected on time. The student can give feedback in online system provided by administration. Administrator can prepare questions and can add, update these questions to the online system. After that it is made accessible to the students to give feedback about the lecturers. Administrator can view the feedback given by students that can be represented in the form of graphs and charts. The purpose of this feedback questionnaire is to gather information on students' learning experience, as well as overall responses. The opinion or information provided by the students is useful for the teacher(s) in the ongoing efforts and enhance the quality of education. The opinion provided by the student will be kept confidential. The evolution will be calculated on the basis of total scores from the responses from all students. Student(s) has to mention only his user id, need not to mention his name. The most attractive feature of the online system is the capability of opinion mining.

The key features of Configurable Feedback System are as follows:

- Configurable.
- Report Generation
- Deducing of sentiment analysis from free form text writing by using SWN (AAAVC) approach (Singh et. al., 2013a, 2013b)

JSP, Servlet and Java technologies have been used for backend module of the system, whereas for frontend modules HTML5, CSS, AJAX, and JavaScript have been used.

3.1 Description about System

The use case diagram of system is shown in figure 1. As can be seen from figure there are two main actors that play important role in the system, which are Administrator and User.

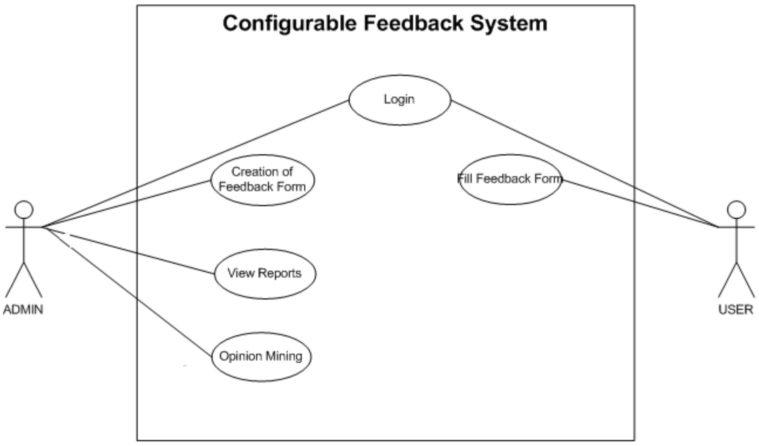
3.2 Description about Admin Module

The admin create the environment for user, where user can give its feedback about course instructor. In the Use Case diagram in Figure 1, there are four components at Admin Side: Login, Creation of Feedback Question, View Report and Opinion Mining.

3.3 Creation of Feedback Form

Feedback form is created from a set of existed questions whereas the administrator can add any number of questions to the question set. There are two types of questions Yes/No type and Ranking type. Moreover a free-form text box is added to the form to facilitate to write overall comment about the course. The ranked questions are scored in the range of 1 to 5 and Yes/No questions are scored either 0 or 5. At the time of creation of feedback form the number of users, validity of the feedback is also configured. This feedback form can be modified if any user has not submitted his feedback. The system also facilitates admin to increase number of users for created feedback form within the validity.

Figure – 1: *Use Case Diagram*



3.4 View Report

In this Admin can view the evaluation of submitted feedback by users about particular course in the form of graphs. For a particular course, all filled feedback forms given by users are summed and averaged question wise to obtain an overall score. In this component written free form text is not evaluated. The bar graph and pie chart represents these scores.

3.5 Opinion Mining

In this admin can view the evaluation of free form text. To evaluate the writing part, SentiWordNet based SWN(AAAVC) approach is used where for each comment. The detail description about SWN(AAAVC) is discussed in (Singh et al. 2013a).

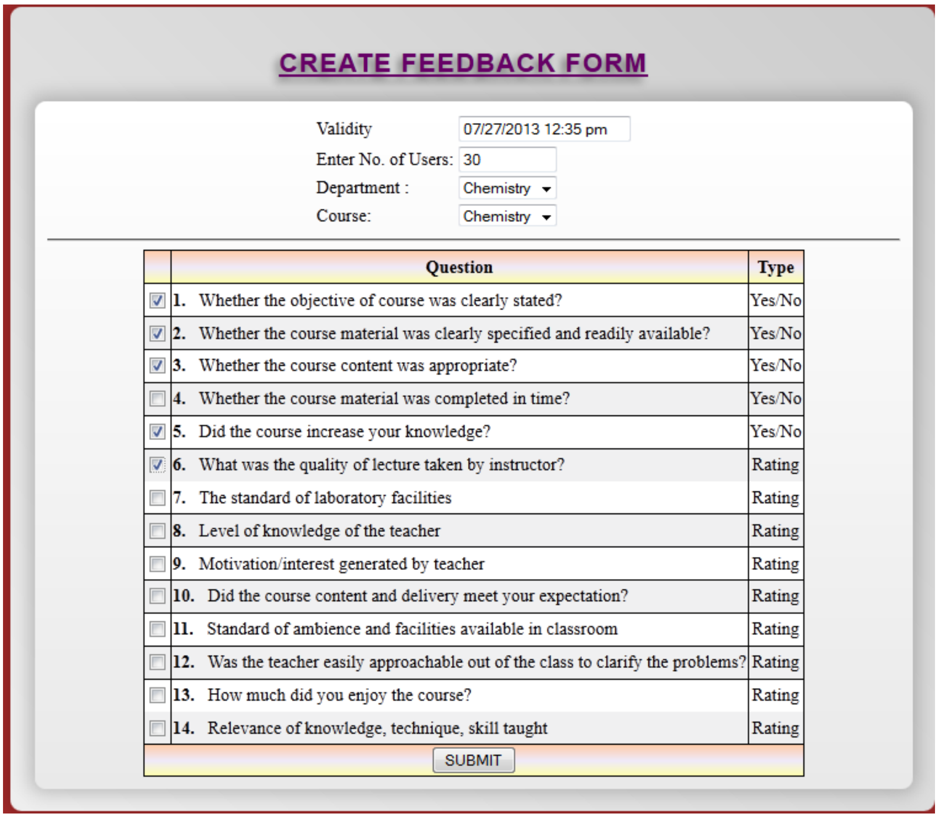
3.6 Description about User Module

The user role is only to provide feedback. The user must be provided a pair of user id and password for each course. After a successful submission of a feedback the user cannot log in again to the system.

3.7 Dry Run of System

The feedback has been collecting by running the system for two courses and 30 users, Chemistry (Instructor: Andrew MacFarlane) and Psychology (Instructor: Joseph Morrissey). Dataset1 refers to Chemistry and Dataset2 refers to Psychology. Figure 2 shows the creation of Feedback form. Figure 3 shows snapshots of feedback filled by user. Figure 4 and figure 5 shows result of feedback question. Figure 6 and figure 7 shows the opinion mining of free-form text. It is observed that Psychology course is highly liked by the users then Chemistry course.

Figure – 2: *Creation of Feedback Form*

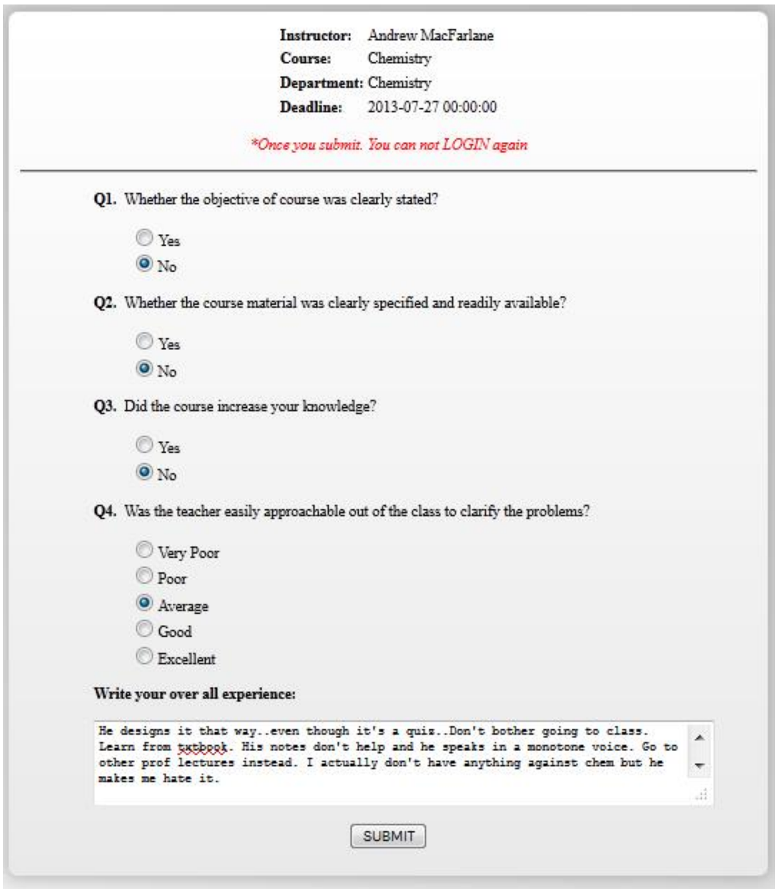


CREATE FEEDBACK FORM

Validity 07/27/2013 12:35 pm
Enter No. of Users: 30
Department : Chemistry
Course: Chemistry

	Question	Type
☑	**1.** Whether the objective of course was clearly stated?	Yes/No
☑	**2.** Whether the course material was clearly specified and readily available?	Yes/No
☑	**3.** Whether the course content was appropriate?	Yes/No
☐	**4.** Whether the course material was completed in time?	Yes/No
☑	**5.** Did the course increase your knowledge?	Yes/No
☑	**6.** What was the quality of lecture taken by instructor?	Rating
☐	**7.** The standard of laboratory facilities	Rating
☐	**8.** Level of knowledge of the teacher	Rating
☐	**9.** Motivation/interest generated by teacher	Rating
☐	**10.** Did the course content and delivery meet your expectation?	Rating
☐	**11.** Standard of ambience and facilities available in classroom	Rating
☐	**12.** Was the teacher easily approachable out of the class to clarify the problems?	Rating
☐	**13.** How much did you enjoy the course?	Rating
☐	**14.** Relevance of knowledge, technique, skill taught	Rating

Figure – 3: *User Filling the Feedback Form*



Instructor: Andrew MacFarlane
Course: Chemistry
Department: Chemistry
Deadline: 2013-07-27 00:00:00

**Once you submit. You can not LOGIN again*

Q1. Whether the objective of course was clearly stated?

○ Yes
● No

Q2. Whether the course material was clearly specified and readily available?

○ Yes
● No

Q3. Did the course increase your knowledge?

○ Yes
● No

Q4. Was the teacher easily approachable out of the class to clarify the problems?

○ Very Poor
○ Poor
● Average
○ Good
○ Excellent

Write your over all experience:

He designs it that way..even though it's a quiz..Don't bother going to class. Learn from txtbook. His notes don't help and he speaks in a monotone voice. Go to other prof lectures instead. I actually don't have anything against chem but he makes me hate it.

Figure – 4: *Feedback Question Result for Psychology Course (Positive)*

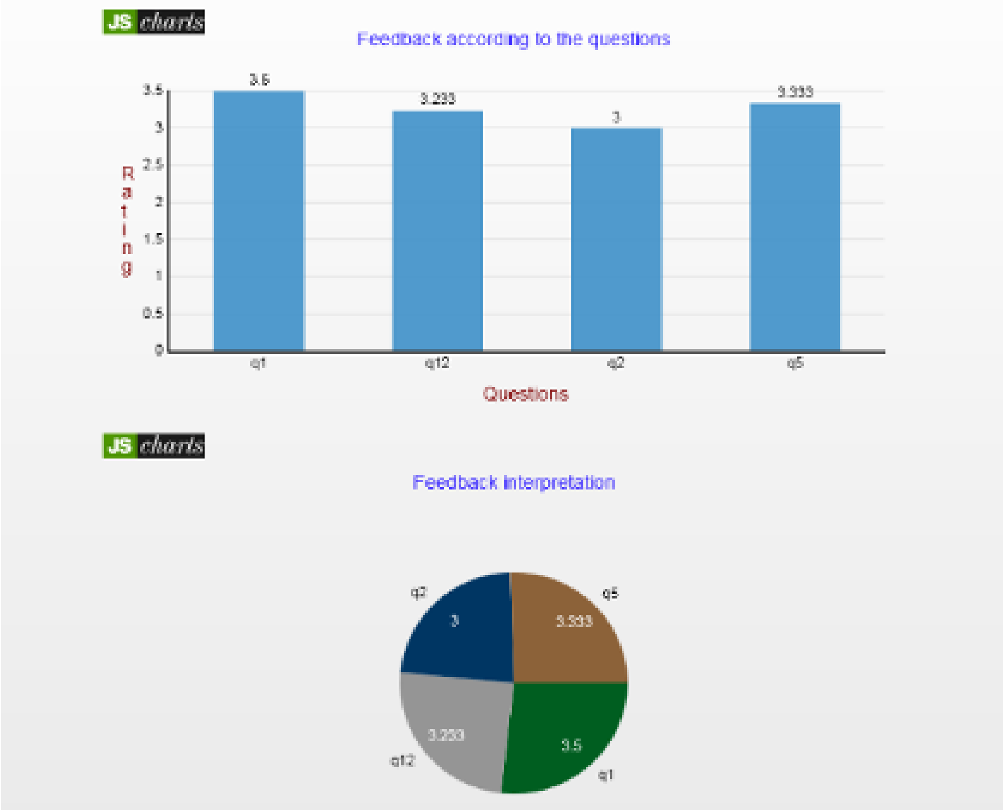
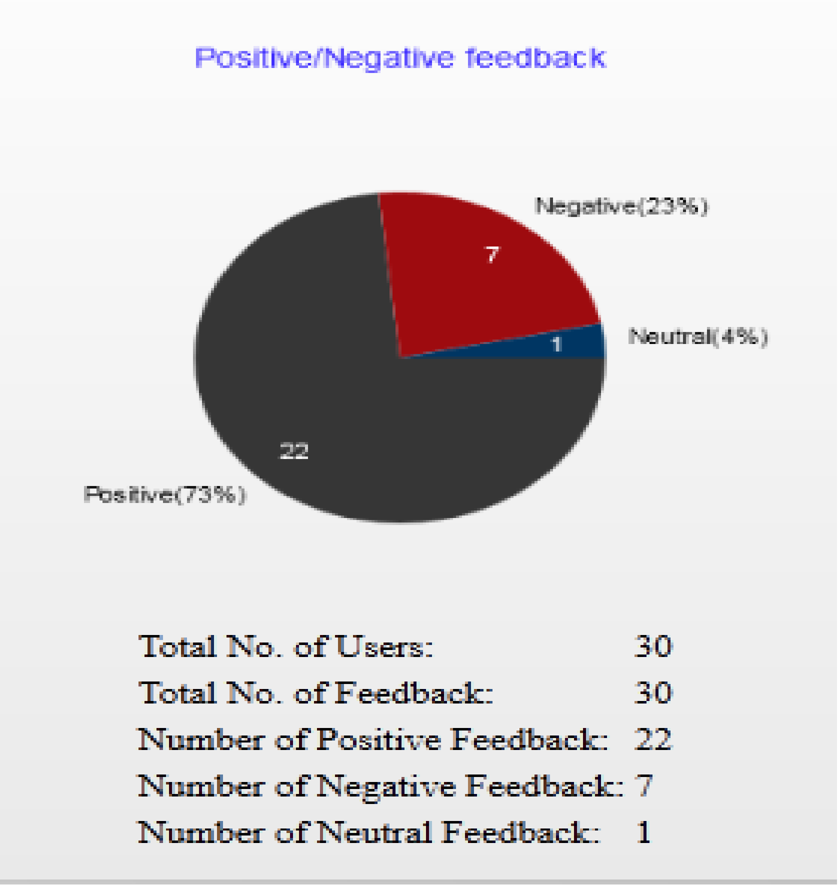


Figure – 5: *Opining Mining Result of Free-Form Text Box for Psychology Course (Positive)*



Total No. of Users: 30
Total No. of Feedback: 30
Number of Positive Feedback: 22
Number of Negative Feedback: 7
Number of Neutral Feedback: 1

Figure – 6: *Feedback Question for Chemistry Course (Negative)*

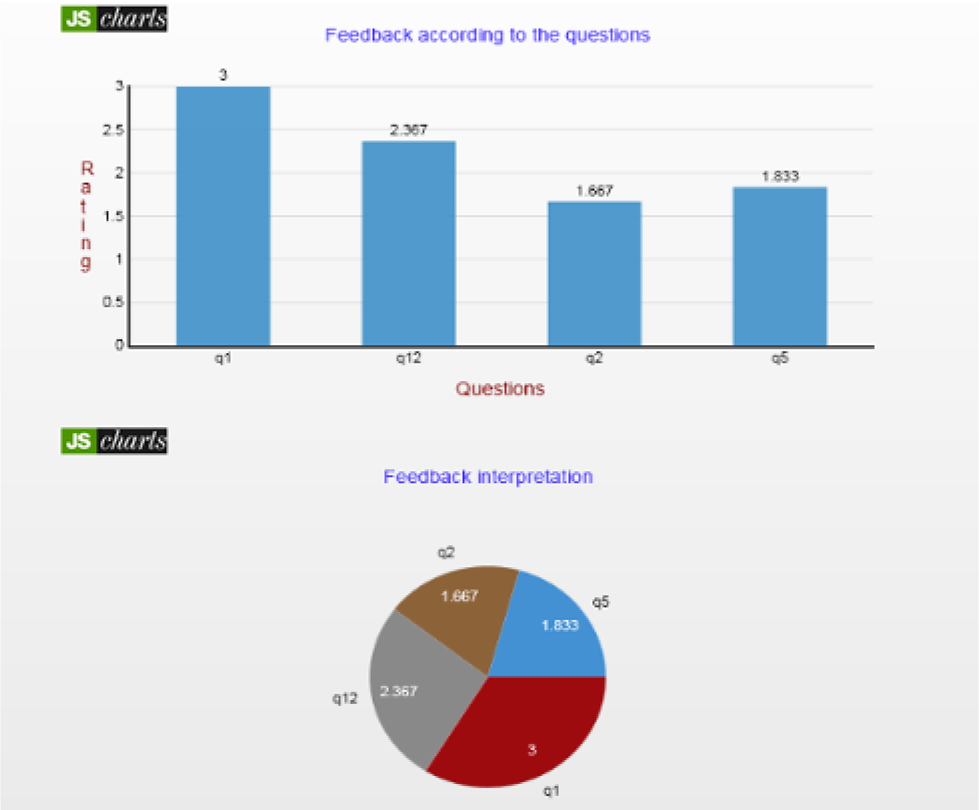
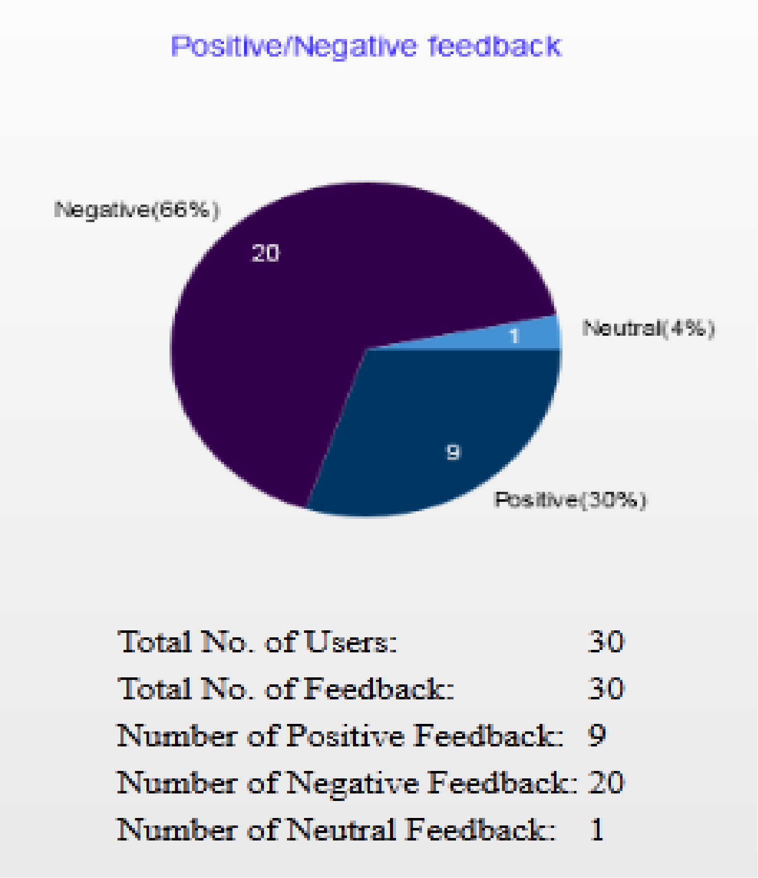


Figure – 7: *Opining Result for Chemistry Course (Negative)*



Total No. of Users: 30
Total No. of Feedback: 30
Number of Positive Feedback: 9
Number of Negative Feedback: 20
Number of Neutral Feedback: 1

CONCLUSION

The configurable course feedback system implemented through which interactive course feedback forms can be created. The algorithmic formulation has been devised which calculates sentiment polarities from the free-form text responses entered by the users. The system yields a comprehensive output for the use of teachers and/or academic administrators. The system is user friendly and configurable. The system has been evaluated on reviews collected from ratemyprofessor dataset.

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APPENDIX

Table – 1: *Details of Dataset Used*

Dataset	Course	No. of Reviews	Avg. Length (in Words)
Andrew MacFarlane	Chemistry	98	30
Joseph Morrissey	Psychology	659	35